Finally, the features outlined in claims 23 and 24 are of advantage because they enable the welding process control to be optimised and offer a simple means of inexpensively improving older welding equipment or welding current sources by means of a software update.

IN THE CLAIMS:

Please cancel claims 1-12 and replace with new claims 13-24 as follows:

13. Method of detecting welding process voltage (27), wherein the welding process voltage (27) between a welding torch (10) and a workpiece (16) is detected, characterised in that a calculation of the welding process voltage (27) is performed in real time, taking account of the interference variables, in particular an inductance (28) and a resistance (29) of a welding system, in accordance with the formula

$$U_{proc}(t) = U_M(t) - (dI(t) * L) - (I(t) * R)$$

the definition of the formula being as follows:

$U_M(t)$ the instantaneous voltage measured at the welding jacks, in particular at the output terminals 31, 32, by a measuring device 28 via measuring lines 29, 30;

$dI(t)$ the instantaneous change in current;

I(t) the current measured instantaneously at the welding jacks;

R the resistance 29 determined by a static measuring process or preset to a known variable;

L the inductance 28 determined by a static measuring process or calculated during the welding process.

14. Method as claimed in claim 13, characterised in that the calculated welding process voltage (27) is applied by the control unit (4) to the welding process control.

15. Method as claimed in claim 13, characterised in that a calculation process for determining inductance is performed at specific time intervals during a welding process without the welding process being affected.

16. Method as claimed in claim 13, characterised in that the interference variables, in particular the resistance (29) and/or the inductance (28) of the welding circuit are detected and/or calculated by the control unit (4) before the start of the actual welding process.

17. Method as claimed in claim 13, characterised in that a voltage and a current at the outputs of the current source (2), in particular at the output terminals (33, 34) of the

current source (2), are measured by a measuring device (30).

18. Method as claimed in claim 13, characterised in that in order to provide a static calculation of the interference variable of the resistance (29) and the inductance (28) of the hose pack (23) and optionally other ohmic interference variables during a secondary short-circuit prior to the start of the welding process, a current change is imposed on a current curve and the measured voltage evaluated.

19. Method as claimed in claim 18, characterised in that at a predetermined point in time of the current curve, a measurement is taken (4) or the values of the voltage and current detected at the output terminals (33, 34) of the current source (2) by the control unit are used to calculate the resistance (29).

20. Method as claimed in claim 18, characterised in that in order to provide a static calculation of the interference variables, in particular the resistance (29) and the inductance (28) of the hose pack (23), the lines of the hose pack (23) are short-circuited or a short-circuit is produced between the electrode of the welding torch (10) and the workpiece (16) with the supply lines (7) of the hose pack (23) connected thereto, taking account of other interference

variables, in particular of the welding torch (10).

21. Method as claimed in claim 13, characterised in that in order to calculate the interference variables during a welding process for a stable state of the welding process, a balancing pulse is modulated onto or imposed on the welding current, after which the detected values are applied for calculation purposes at fixed points in time.

22. Method as claimed in claim 13, characterised in that the electrical behaviour of the arc (15), in particular an arc characteristic curve, is incorporated in the process for calculating the interference variables.

23. Method as claimed in claim 13, characterised in that a process control or a welding process control is performed during the entire pulse duration.

24. Method as claimed in claim 13, characterised in that the interference variables are calculated by the control unit (2) by means of software using the detected values and a predetermined calculation program.

REMARKS

By this Preliminary Amendment, the application has been